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LIBRARY

THE WENZEL PNEUMATIC CLOCK,

PATENTED BY HERMANN J. WENZEL, OF SAN FRANCISCO, CAL., WITH IMPROVEMENTS BY AUGUSTUS HAHL & CO., OF BALTIMORE, MD.

THE WENZEL
Pneumatic Clock Company

OF THE DISTRICT OF COLUMBIA

Invite the Attention of Architects, Government Officials, College and School Authorities, Hotel-keepers, Owners of Large Buildings and First-class Private Residences, to the accompanying descriptions of the Air-Clock system and Certificates.

ADOPTED AND USED IN THE DISTRICT OF COLUMBIA BY THE U. S. COAST SURVEY OFFICE, (ELECTRIC SYSTEM DISPLACED;) THE U. S. MONEY-ORDER OFFICE, CORNER 8TH AND E STS.; THE U. S. PENSION OFFICE, CORNER PENN. AVE. AND 12TH ST.; THE U. S. PENSION OFFICE, CORNER PENN. AVE. AND 13TH ST.; THE CITY HALL COURT-HOUSE BUILDING; THE CITY POST-OFFICE BUILDING, AND IN EIGHT PUBLIC SCHOOL BUILDINGS, &C.

OFFICE 1416 F ST., N. W.,
WASHINGTON, D. C.

NATIONAL REPUBLICAN PRINT.
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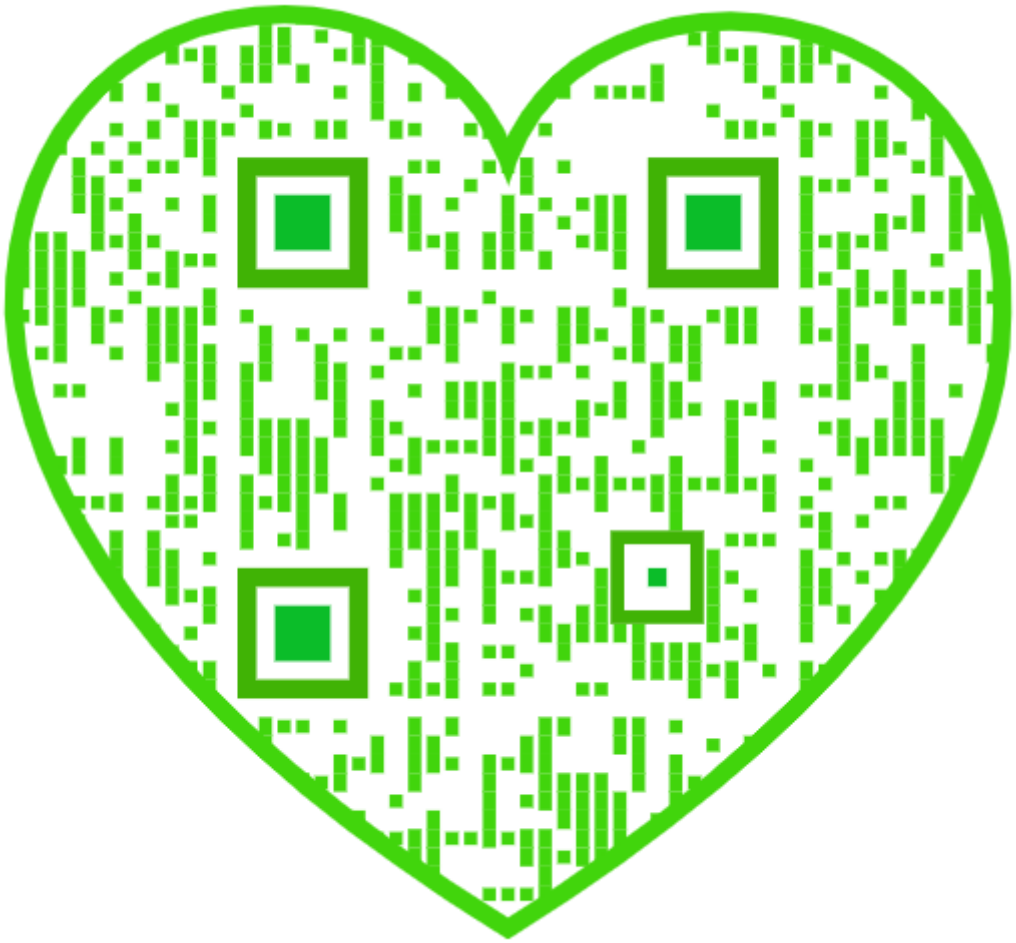

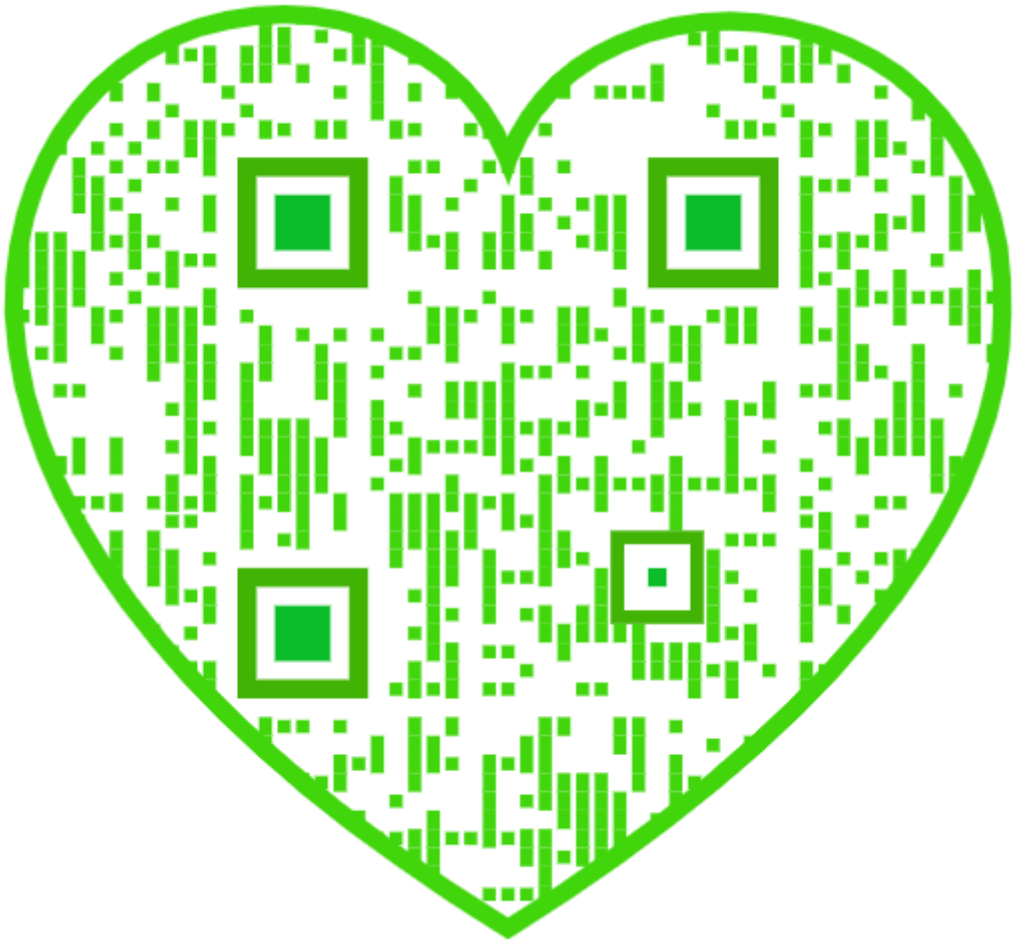

ORGANIZATION:

PRESIDENT,
JOHN A. PRESCOTT, Washington.

VICE PRESIDENT,
AUGUSTUS HAHL, 13 Mercer Street, Baltimore.

TREASURER.
HORACE S. CUMMINGS, Washington.

SECRETARY,
ABNER B. KELLY, Washington.

THE WENZEL PNEUMATIC CLOCK COMPANY OF THE DISTRICT OF COLUMBIA, No. 1416 F street N. W., is now prepared upon short notice to supply the public within its territorial jurisdiction, with the system of uniform time-keeping originally patented by HERMANN J. WENZEL, of San Francisco, California, and since greatly improved by his German friends, A. HAHL & Co., of Baltimore, Maryland. As a full description of the wonderful time pieces employed by it, will be found in the following pages, nothing more need be said on that point.

In 1879, these air clocks were put into the west wing of the City Hall, in San Francisco, where they had proved so entirely satisfactory, after a trial of about four years, that recently, by a unanimous vote of the City Council, a large additional number of them were ordered for other parts of the building in place of Electric Clocks, which were condemned as entirely worthless. And during the last year, they were introduced into the building in this city occupied by the officers of the United States Coast Survey, to the displacement of the very expensive and unreliable Electric Clocks previously in use. Their undoubted superiority over the Electric Clocks having thus been fully established by severe practical test on the Pacific coast, and in this city by one of the peculiarly scientific departments of the General Government, it is not strange that they are now beginning to attract attention. Already they have been adopted in the new Money-Order building of the Post-office Department as well as in the two buildings occupied by the United States Pension Office and they are now being placed in our City Hall or Court House. For these very substantial testimonials by the several officers of the General Government to their surpassing value, we are indebted

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in no small degree to our Board of School Trustees, who are ever on the alert to discover and adopt newly devised aids for educational purposes, by whom these air clocks were first subjected to a practical test in the District of Columbia, the result of which has led to their use in eight of our Public School buildings, securing uniform time-keeping in the various class rooms.

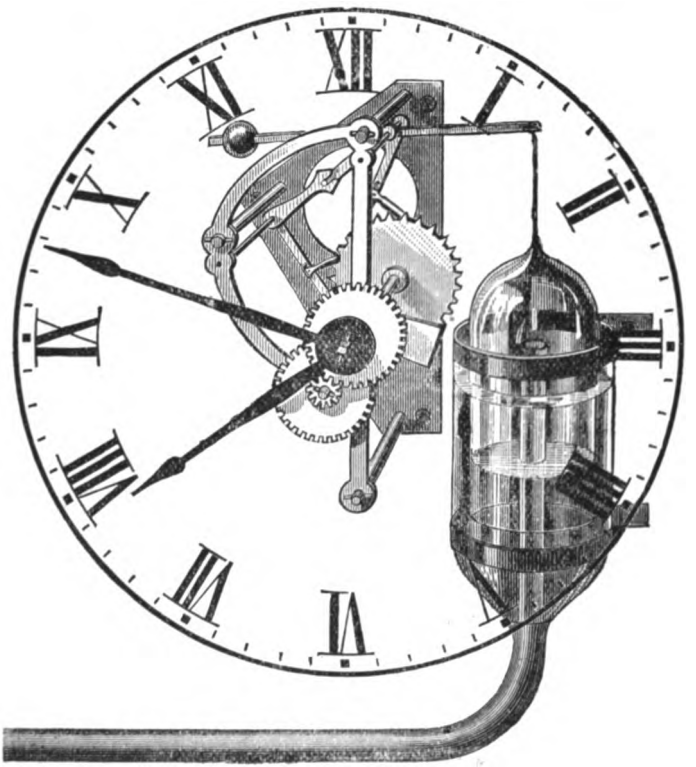
By this system, infallible and uniform time may be had in the largest building, public or private, and, indeed, throughout an entire block or section of the city, according to the size of the "regulator." In large residences, it will be especially welcome as, by it, like time will be indicated in every room, while the imposing regulator may be so placed in the hall way as to remind one of the old fashioned eight-day clocks of former times.

These air clocks can be easily introduced into buildings already completed by using, where the air pipes are exposed to view, small brass tubing, or bronze- or nickel-plated pipes, which can also be used to suspend pictures from. And dials can be furnished in a variety of designs to match the fittings of the different apartments, and embellished to any desired extent.

The first cost of the clocks is quite moderate, and when once put in, there need be little further expense for time-keepers during the lifetime of the house, as they are not liable to get out of order. It may, therefore, be assumed with much confidence that hereafter every private residence that pretends to have within itself all modern conveniences will fall short of the requirements of the times if it has not in use this most desirable time-keeping arrangement.

Estimates and information as to cost, etc., can be obtained at the office of the company, where specimens of regulators and dials can be seen.

DESCRIPTION OF THE AIR CLOCK.



This Cut Represents a Glass Dial Showing Air Pump and Simple Dial Movement.

Extract from "History of the San Francisco Chronicle," published in 1879, pages 22 to 24.

"Entering the Bush street hallway, and passing up the easy graded staircase, noticing meanwhile that the broad steps are covered with corrugated India rubber treads—found on every flight clear to the attic—that the heavy newel posts are of carved black walnut, and that the walls are painted to match, we reach the second floor. It is divided into six fine offices, all but one facing on Bush or Kearney street. They have all special toilet arrangements and fire places, and are arranged to be occupied singly or in suites, as offices or as elegant private apartments. Back of the inside room is a range of closets, etc., for the convenience of the tenants. This floor has a height of fourteen feet. Before mounting to the floor above, or third story,

containing the *Chronicle* editorial rooms, attention is attracted to the wonderful Pneumatic Clock, which stands as did the "ancient time-piece" Longfellow sang about "on the landing in the hall," but which is such a clock as our grandfathers never dreamed of.

What we see here, is a black walnut case six feet high, three feet across, and two feet deep. The black walnut casing stops at the upper front portion, which is composed of a sheet of plate-glass, admitting an unimpeded sight of the interior and the works it contains. The works are divided into two sections, the upper and lower, which may be styled the mechanical and the pneumatic. The upper or mechanical works are by no means complicated, and consist, as may be seen, of three parts; a barrel, on which is wound a weight, whose gradual descent is used for the obtainment of a uniform power, and a pendulum that swings leisurely to and fro, its oscillation being indispensible to the accurate measurement of the fleeting hour. These two embrace the principle of construction, made use of by Galileo, Huygens and Hooke. In fact, these conditions of movement being absolutely necessary, it is impossible to manufacture the motive and regulating power of an accurate time-piece, of a shape and of a size at all adapted for the requirement of such a building as this without employing them. The few cog-wheels and ratchets which are seen, are only for the purpose of obtaining regularity of action, and for the escapement. It is unnecessary to describe them, as they are found in some form in every other clock. It will be necessary, however, to say that this clock-work, instead of being employed to move two hands around a dial is arranged to move a slight bar or beam up and down upon a pivot at regular intervals of a minute. To each end of this beam, a dependent wire may be seen attached, and following the downward direction of these, observation is led to the lower and pneumatic portion of the clock, or regulator, as the inventor styles it. Here we find them attached to the closed upper ends of two glass cylinders, which have their open ends immersed in two glass bowls, half filled with diluted glycerine, which neither contracts, expands, nor evaporates. Only one is immersed at a time and the dip and rise of the cylinders correspond with the dip and rise of the beam. Rising from the bottom of the bowls, and coming an inch or two above the surface of the fluid, two tubes about half an inch in diameter may be seen. The wires entering these tubes to serve as guides for the steady action of the cylinders, and the continuation of these tubes to any part of the house, completes the system of clock propulsion so far as the regulator is concerned. The method of operation by which the time is marked is still more simple. The immersion of the glass cylinder in the fluid, caused by the drop of the beam, naturally condenses the air, within it. The only escape to relieve the pressure is that through the pipe, and if we follow the pipe to its end, we shall see the result. The extremity reached, we are face to face with the time-indicator. Behind the dial, which for

the nonce we will suppose to be transparent, there is first remarked a miniature edition of one of the pumps in the regulator. A small glass cylinder, half filled with diluted glycerine, contains suspended a smaller cylinder of the same material. Through the bottom of the outer cylinder enters the pipe which we have followed, and ascending through the fluid, rises a little distance above its surface.

Let us now suppose that the beam in the regulator has dropped; the attached glass cylinder descends with it, and the condensed air is forced through the pipe. Being forced into the pipe, it has to travel in its condensed form until an outlet is found. Here, behind the dial, is that outlet. The same air-bubble, so to speak, that has been skurrying through the pipe, flits out of the open extremity and strikes the inner and suspended glass cylinder with just enough force to raise it a trifle. The suspended cylinder is attached to a small arm connected with a ratchet-wheel, each notch of which values a minute; the rising of the arm moves the ratchet-wheel forward one notch, and being on a pin to which the hands are fastened, the forward movement sends forward the hands that one minute of time. The air pressure being relieved, the cylinder and arm fall again, a reciprocating movement of the ratchet-wheel goes forward another minute, and so the unfailing time is marked—not only marked on this particular dial, but simultaneously on as many dials as are necessary. There are at present no less than twelve hour-scarred faces in the building—two in the basement, (in the press-room and mailing-room), one on the ground floor (in the business office), one on the landing of the second floor, six on the third floor (in Charles De Young's private office, his Secretary's room, the local room, the managing Editor's, the editorial room and the library,) one in the composing room, and the last in the mail-room in the fifth story. On all of these, at the same second of time, the hands noislessly pass over their allotted space. Distance from the motor clock does not affect the time; the pressure continues intact until it finds relief. Heat and cold have no influence on the time-keeping, for the cylinders in the regulator are lifted out of the liquid at each upward movement in order to allow the air within the tubes to equalize with the outside air, and therefore no difficulty can arise from atmospheric changes, as would be the case if the air were confined. The machinery is so simple that it cannot get out of order; in fact, there is nothing to get out of order. Wound up once a week, the silent motion is communicated to the hands by the pulsation of the air-pumps of the regulator working unceasingly and infallibly in its case here. Numerous attempts have been made for many years by eminent men of different countries to obtain a uniform system of time registration by all the clocks in one house, and even of all the public clocks of a city. Wheatstone introduced electric clocks as long ago as 1840, and succeeded in obtaining very promising results, but it was soon ascertained that they were unreliable as time-keep-

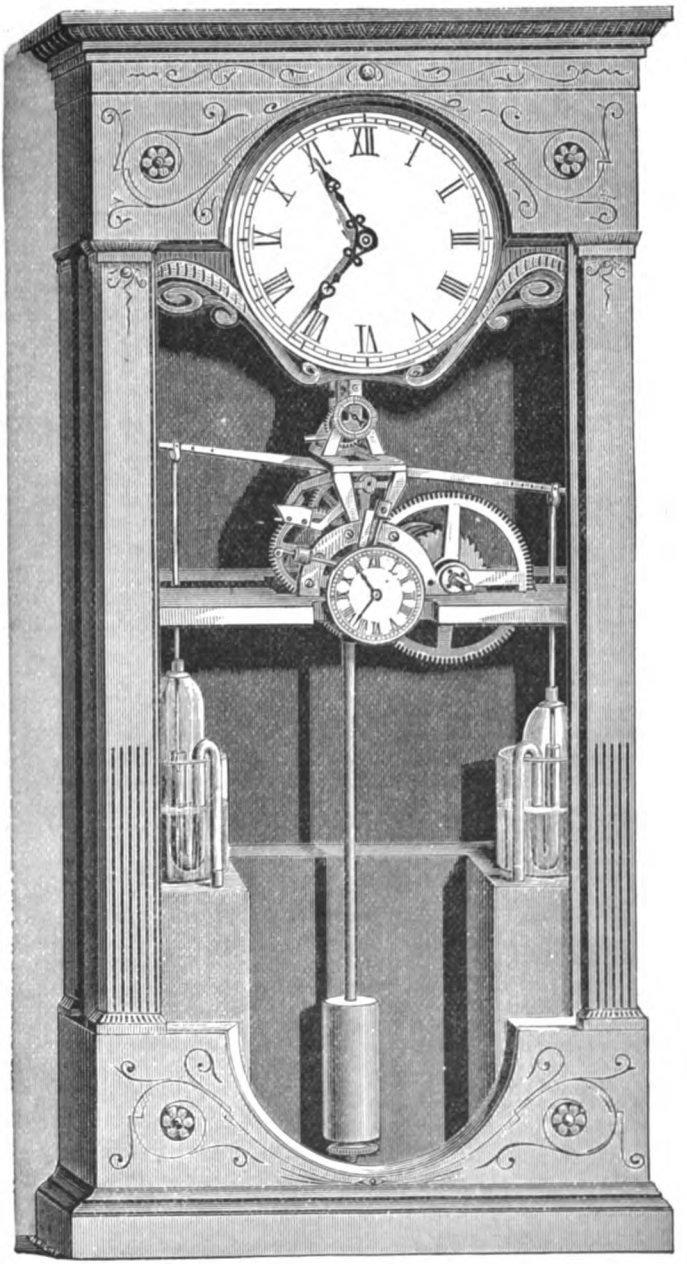
ers, and were therefore early discarded. Many modifications in their construction have been proposed, but the difficulties in the way of accomplishing this end seems insurmountable and impossible to overcome. It has been reserved for California to put into operation the most valuable invention connected with clocks since the time of Galileo, the most remarkable, and at the same time the most simple and unfailing means of obtaining uniformity in the registration of time ever suggested. It is indeed so simple that the only point of astonishment is that it has never been thought of before, and at the same time so perfectly reliable in its action, and comprehensive in its scope, that the number of clock-faces upon which it is capable of showing precisely the same time as that indicated by the regulator is practically unlimited. The inventor and patentee of this wonderful system of indicating time at different places by means of one standard regulator is Hermann J. Wenzel, of San Francisco; and the proprietors of the *Chronicle*, ever ready to aid deserving labor and advance the progress of the age, have at great expense, fitted up their present quarters with this nearly infallible system of recording time. The first experiments with air-clocks were made twenty years ago by Mr. Wenzel, but it was not till 1878 that a patent was granted to the inventor. Air-clocks were placed in the same year in the San Francisco bank; also in the Nevada block, and in the rooms of the San Francisco *Verein*. Since then the inventor has obtained two more patents, and has much simplified and improved his invention up to the present standard. The introduction of this clock has so far been confined to San Francisco and vicinity. The European patents have been taken out in the name of E. J. Maybridge, who, in a description published in the *Scientific American*, was erroneously named as the inventor. As is very often the case with discoveries of practical value, the man who does all the thinking and who gets gray over his experiments, fails to get the credit due him, and these motors have been introduced in France and Austria as the latest European invention. We make mention of this fact here because we claim Wenzel's Pneumatic Clock as a genuine California "production."

The following certificate was given to the inventor by the proprietor of the *Chronicle*:

We take pleasure in testifying to the fact that the Pneumatic Clocks furnished by you for the *Chronicle* building have been in operation during the past six months, and have, during that period, kept acurate time on thirteen different dials, and have in every way given us perfect and entire "satisfaction."

Respectfully, CHARLES DE YOUNG & CO.

Regulator Suitably Cased for Hall or Library.



CORRECT TIME.

CERTIFICATES.

OFFICE OF THE NEW CITY HALL COMMISSIONERS,

SAN FRANCISCO, *December* 1, 1879.

HERMANN WENZEL, ESQ.,

DEAR SIR: Your invention of the Air-Clock system has been introduced in the west wing of the New City Hall building, and has given perfect satisfaction.

Respectfully,

A. J. BRYANT, *Mayor.*
W. C. BURNETT, *City and County Attorney.*
E. A. HATHERTON, *Architect.*
GEORGE THOMAS, *Secretary.*
JAMES PURDY, *Superintendent Public Works.*

NOTE.—After a trial of both clocks for nearly four years, in November, 1882, the Electric Clocks in the remaining wings of the City Hall building were, after examination, reported by a committee of the City Council to be entirely worthless, that they never kept correct time, although the Electric Clock Company had obligated itself by contract to keep the sixty-three clocks in the City Hall, for which the City paid $3,460, in good order for the term of five years, and the committee recommended that a contract be made with Mr. Wenzel to furnish Pneumatic Clocks, to take the place of the Electric, the recommendation being adopted unanimously.

The invention of the Pneumatic Clock has entirely superseded the Electric Clock here in San Francisco, for the simple reason that it is positive, never gets out of order, and is cheaper than the best Electric Clock known. They are used in all the principal hotels, banks, City Hall, and, in fact, in all buildings of any note in San Francisco, and as Mr. Wenzel is now on an eastern tour to introduce them in the principal houses of the east, I cannot help but fully endorse him and his invention.

JNO. AUG. REMER, *Architect.*

Between the Church, House and College, we have 49 dials, all run through some miles of pipe, by the same regulator, and I must say that the experiment has proved a success. All our fathers are pleased with it, and find it of great convenience to have these dials marking simultaneously the correct time in all the class-rooms, offices and corridors. The principle of these clocks is so simple that we find in it a guarantee of present success.

Yours truly,

A. VAROI, *S. J.*

OFFICE OF SUPERINTENDENT OF COMMON SCHOOLS,

SAN FRANCISCO.

H. WENZEL,

DEAR SIR: Your invention of the Air-Clock system, by which all the clock dials in a building are made to show uniform and correct time has proved a perfect success in the buildings where they have been introduced by this department.

These clocks are the very best for school houses; they teach punctuality and the value of time, and promote order and system.

We wish you all success to the introduction of your invention in other cities.

JOHN W. TAYLOR, *Supt. of Common Schools.*
GEORGE BEANSTON, *Secretary.*

SACRAMENTO, *May* 8, 1880.

MR. H. WENZEL,

DEAR SIR: The Pneumatic Clock which is in the Capitol Grammar School in this city, shows correct time on the eleven dials, and gives great satisfaction. We certainly feel grateful to you for the invention.

Respectfully yours,
J. W. JOHNSON, *Principal Capitol Grammar School.*

I heartily endorse the above recommendation of the Air-Clocks.

Respectfully,
T. L. LANDERS, *City School Supt., Sacramento City.*

We have seen and watched by our own observation, for several years, the experiments and studies of Mr. H. Wenzel to perfect an entirely new motive power for clocks, by which he intended to make any number of clock-dials to show the same and correct time. When we built the Nevada block, we wished to give him a chance to introduce his invention, and ordered 22 clocks, which proved such correct and reliable time-pieces, that we ordered 20 more for the offices up stairs.

Now, after three years trial of these Air-Clocks, we can certify to the following facts:

These clocks have kept correct time.

They show all alike, and every one the same time.

They require no attention of winding or regulating

There is, when once put up, no expense—the motive power being atmospheric air.

It is with pleasure, that we recommend the invention of Mr. Wenzel to all who are in need of correct time-keepers.

CORNELIUS O'CONNOR, *Supt. of Nevada Block.*

The undersigned hereby certify that the Pneumatic Clocks made for our offices by Mr. Wenzel are good, reliable time-keepers, and have given us full satisfaction.

THE NEVADA BANK OF SAN FRANCISCO,
By LOUIS McLANE, *President.*
THE FIRST NATIONAL GOLD BANK OF SAN FRANCISCO,
By R. C. WOOLWORTH, *President.*
CONSOLIDATED VIRGINIA MINING COMPANY,
By A. W. HAVEN, *Secretary.*
WM. WILLIS, *No.* 29 *Nevada Block, 3d floor.*
J. F. LEGHTNER, *No.* 38 *Nevada Block, 4th floor.*
J. B. HAGGAN, *No.* 50 *Nevada Block, 3d floor.*
J. M. WALKER & CO.,
H. SCOTT & CO.,
ZADIG & WEIL,
E. E. EYRE.

I hereby certify that H. Wenzel's Air-Clocks, in London and San Francisco Bank building, have given full and complete satisfaction, both as to the regularity of their keeping time, and their simplicity of construction.

MILTON S. LATHAM, *President.*

The Baldwin is fitted up with Mr. Wenzel's Air-Clocks. They are a success, and of great importance and convenience in a first-class

hotel, showing the correct time all alike in the different departments of the building. They are simple in construction, and well adapted for all purposes, useful or ornamental.

E. J. BALDWIN.

The undersigned certifies to having in use, sixty Air-Clocks of Mr. Wenzel's patent, in the new Baldwin Hotel, and by his own observation can recommend these clocks to any one in need of good time-keepers.

ALEX. McCABE, *Supt. of Building of Baldwin Hotel.*

Twenty Pneumatic Clocks, made by H. Wenzel, for the offices of the Real Estate Association building, give full satisfaction.

WILLIAM HOLLIS, *President.*

The Vohlmoos Hotel has in use Mr. Wenzel's Air-Clocks. They are a success, and of great importance for the punctual and systematical management of a first-class hotel.

JOHN VOHLMOSS, *Proprietor.*

From The Evening Post of New York, of November 5, 1881.

There is a movement to introduce into this city a new kind of Pneumatic Clock, invented by a citizen of San Francisco, by which any number of clocks, up to several hundreds, or even thousands, may be run and regulated from one large clock. The principle is a novel one, unlike that of any other Pneumatic Clock yet invented, and differs from the Paris Pneumatic Clocks in that the central clock furnishes the compressed air with which they are run. * * * The system has been successfully employed in several large buildings in San Francisco for the last three years. It has already been introduced into a number of large buildings here, and the Stock Exchange, Building Committee are considering the propriety of adopting it.

From The Daily Graphic, N. Y., of August 17, 1881.

An invention almost as useful as the Telephone is the Pneumatic Clock, which has already been introduced on an extensive scale in Paris and other large European cities, and in this country is in use in San Francisco, in the government buildings in Washington, in the large hotel at Rockaway Beach, in St. Francis Xavier's College, of this city, and elsewhere. Every householder knows what a nuisance it is to keep the clocks in different rooms in order or even to see that they keep tolerably correct time. To see that they are wound up regularly is quite a task in itself, and the confusion occasioned by their constant variations is frequently the subject of animadversion by the head of the family. This new system will do away with all this. One regulator, wound up once a week, once introduced into the house will regulate and run all the others without requiring any attention whatever.

The Pneumatic Clock company is now making arrangements on an extensive scale, to furnish hotels, public buildings, banks, insurance offices, and business and private dwelling houses with the clocks, which will obviate, once for all, all risks of incorrectness of time, as well as abolish all the drawbacks of the ordinary clock. Time is money, nowadays, and correct time is very often of the utmost value, so that, apart from the trouble the system saves, it has enough to recommend its general adoption. As it, however, in the long run,

will be found much less expensive than keeping the present style of clock in order, it seems sure of success. * * * The company claims that it can demonstrate to owners of apartment houses, office buildings, &c., that they can realize an additional permanent income of from $300 to $1,500 per annum, or twenty-five per cent. on their investment, by adopting this system. They also hold themselves ready to give estimates for furnishing any number of clocks for hotels, schools, colleges, banks, railroad offices, factories or private residences, and to charge not more than one cent a day for each clock used, and no charge whatever for putting them in, thus making the entire cost of each clock $3.65 a year.

From The Boys of New York, April 29, 1882.

Recent invention has made it possible to move and regulate the clocks of a whole city by means of compressed air furnished from central stations. The pneumatic clock, therefore, promises to become, like the telephone and the telegraph, of great public use, and an important addition to the conveniences of modern life.

At the Paris Exhibition of 1878 a very ingenious contrivance for the pneumatic distribution of time attracted much attention. The inventors, etc., * * * * had not then perfected their arrangements for moving and regulating them. When they applied to the city authorities for the privilege of distributing time as a monopoly for fifty years, they were unable to get the concession. Since that day, however, they have so improved their system, and the exact time furnished by them has become so useful to the public, that the municipality are now willing to grant them what they formerly asked for, and they have undertaken to do the work on a large scale in Vienna.

In Paris, too, since 1878, a large number of house-holders have had the time transmitted to their residences by the pneumatic process, and numerous pneumatic clocks have been put up in the streets. At first pipes, through which the compressed air could be sent, were laid down in the sewers of the first, second and ninth arrondissements of the city. There was, however, no distribution of time to private residences. Soon, however, a company known as the Compagnie Generale des Horlogues Pneumatiques, was authorized to perform this service, and a year ago last March it was ready to begin the work. Six miles of pipes had been laid down, and four clocks, which received the pneumatic time from the central works, were fixed on lamps on the boulevards. These public clocks came to be of great use. Their time was always correct, and people got into the habit of regulating their watches by them. Subsequently the system was further extended, and now there are sixteen miles of pipe laid down in the sewers, and two thousand pneumatic clocks in five hundred houses, are connected with the central works, and are receiving the time from them. The number of public clocks in the streets has been increased to fourteen, with thirty-three dials.

The system has worked so well, and has proved of such great public convenience, that of late, we are told, the patentees have obtained a concession from the Prefect of the Seine, which will enable them to vastly extend their arrangements for distributing the time. Their plan is to lay down pipes, through which they can send compressed air which will actuate all the clocks of Paris, if necessary.

This is the way in which the time is sent: At the central works there is a great clock, which controls the whole system. It is a pendulum clock of remarkable precision and perfection of mechanism. To it is connected a peculiar contrivance, by means of which a valve

is opened and shut every minute. When the valve is opened, compressed air, furnished by steam engines working air-compressing machines, is admitted into the system pipes, and all the clocks connected with it are actuated at the same time. The opening takes place at the sixteenth second of each minute, and the air flows for twenty seconds, when the valve is closed. This space of time allowed is the result of experience, and may be varied according to the distances through which the compressed air has to travel.

It is not necessary for us to describe the machinery in detail; nor shall we attempt to explain the mechanism of the clocks worked by the pneumatic system. It is enough to say that as the central clock moves, so move all those connected with it. In this way exact and uniform time is furnished, and when the pneumatic company takes advantage of their concession, which gives them a monopoly of laying pipes for fifty years, it will be supplied throughout Paris. The cost, too, is so small that the people generally will be able to have it. Thus the charge for a single clock is only one cent a day, and if there are more in a house the price for each is much reduced. This price, however, includes laying the pipes and supplying the clock. Since the pneumatic system saves the householder from all cares about his clocks and all expense for their repair, it will seem that the cost is no greater than that of maintaining the old time-pieces. By it, too, he can always be sure that he has the right time.

The pneumatic clock, therefore, is a great gain, and is likely to be introduced in many cities.

From The Popular Science Monthly of January, 1882.

But there is another novel and ingenious method for the distribution of time in use in Paris, which * * * has both convenience and economy to recommend it for general uses, and for that reason has become quite extensively employed in a short time.

Abandoning electricity as uncertain means for moving clock-work at a distance, the inventors * * * have accomplished the same object by the use of compressed air, and for this reason have called their clocks "Pneumatic Clocks." They were exhibited at the exposition at Vienna in 1878 and are now widely distributed in that city.

The essential parts of the system are three: 1, Machinery whose function is to compress the air, and to propel impulses of the same every minute; 2, pipes led through the streets and into the houses; 3, dials provided with mechanism for receiving the pneumatic impulses. * * * Excellent as the system is for general uses, the pneumatic dials cannot be used for accurate time work, because it requires in the extreme case, for a distance of twenty thousand metres, at least ten seconds for the impulse to reach its destination. Thus it will be seen that each dial is slow a certain number of seconds, depending upon its distance from the central station; nor has it been found that the error of any particular dial is constant. But the error will never be allowed to exceed ten seconds.

Should the extension of the system require it, Paris will be divided into six districts, (surveyed so that no point in the city shall be over twenty thousand metres from a central station), each provided with its central station, equipped in other respects as they are described, but all receiving their compressed air from a common reservoir centrally located.

However, there are plenty of people in Paris, as there are doubtless, in every city, for whom a time even ten seconds in error is accurate enough. The system was put into operation there about March 15, 1880, and in the first four months there were fifteen hundred subscribers, distributed in six hundred houses. The popularity of the

Pneumatic Clocks is due to their convenience and cheapness. The rental is only five centimes (one cent) per day for the first clock; four centimes (eight mills) per day for the second clock; three centimes (six mills) per day for the third and every subsequent clock rented by the same person, and the expense of pipes and apparatus is borne by the company.

BUREAU OF YARDS AND DOCKS, NAVY DEPARTMENT,
WASHINGTON, D. C., *May* 26, 1882.

SIR: The Bureau begs to acknowledge the reference to it, by the Hon. Secretary of the Navy, of your letter of the 24th instant, with a copy of a communication addressed by you to his predecessor, inviting attention to a new method of uniform time-keeping, known as the "Wenzel Pneumatic Clock System," and requesting that the subject-matter be referred to the proper officers for examination and report.

The Bureau, in compliance with your request, has this day referred your letter to the commandant of the Washington Navy Yard with instructions to order a board to examine and report upon the Wenzel Pneumatic Clock system.

Any papers that you have bearing upon the subject, may be forwarded to the commandant of the yard to assist in the examination.

Very respectfully, your obedient servant,

A. E. MERRITT, C. C.,
Acting Chief of Bureau.

JOHN A. PRESCOT, ESQ.,
President Wenzel Pneumatic Clock Company, D. C.

BUREAU OF YARDS AND DOCKS, NAVY DEPARTMENT,
WASHINGTON, D. C., *June* 21, 1882.

SIR: The Bureau begs to acknowledge the reference to it by the Department of your letter of this date, requesting copy of report of board of officers attached to the Washington Navy Yard upon the merits and advantages of the Wenzel Pneumatic Clock system.

The department having authorized the Bureau to furnish you with a copy of the report, the same is herewith enclosed for your information.

Very respectfully,

A. E. MERRITT, C. C.,
Acting Chief of Bureau.

JOHN A. PRESCOTT, ESQ.,
President Wenzel Pneumatic Clock Company.

CHIEF ENGINEERS OFFICE, U. S. NAVY YARD,
WASHINGTON, *June* 12, 1882.

COM. THOMAS PATTISON, *U. S. N. Commandant,*

SIR: In compliance with your orders of the 26th ultimo, we have made an examination of the Wenzel Pneumatic Clock system, and respectfully report as follows:

The propelling power of the system consists in a regulator of simple construction run by a weight. To this clock a simple air pump is attached, consisting of a lever suspending from each one of its ends, a glass cylinder or bell, the open end down. Beneath each cylinder is a glass jar, partially filled with glycerine. A small pipe runs through the centre of the jars, one end reaching above the surface of the liquid, and the other is conducted to the different clocks of the system. By the alternate motion of the lever the in-

verted cups are, at every other minute, plunged into the glycerine, and by this process the air is compressed in the cups, and in the small tubes connected therewith, which causes the small cylinder of similar air pumps attached to each one of the clocks in the system to rise and start the hands one minute ahead. The lifting of the cylinder on the main clock above the liquid releases the air in both the cylinder and small pipes every minute, and any expansion or contraction is thus neutralized, and the hands of the several clocks in the system made to move simultaneously and show the regulator time.

In order to secure absolute correct time-keeping, the escapement is made to be entirely independent of the train of wheels which operates the pumps, and it consists of only one gear and the escapement wheel, so that the irregularity in power by transmitting it through several gears, the friction from pivots, and the thickening of oil, are all reduced to a minimum. The propelling power for the escapement is a small weight, which is wound up every minute by the large movement while working the pumps. A maintaining power is also provided, which operates while the weight is being wound up, the result of all of which is, that the escapement receives at all times a constantly uniform power, and the regulator becomes actually an astronomical clock, and, consequently, all the clocks or dials which are propelled by the regulator. The number of dials or clocks which can be worked in a system is limited only by the size of the main or motor bells, and the power of the regulator to work the same, but it seems to have been found in practice, that a glass bell three inches in diameter, and ten inches high, will furnish air-pressure enough to work fifty smaller bells such as are used in the different clocks or dials of a system.

The following advantages are claimed for the Pneumatic Clocks:

The clocks in the system require no winding or attention of any kind, as the winding up of the main regulator once a week, regulates and runs all the others.

There are but few works in the dials needing oiling or cleaning.

It is a perfect system of uniform time, the correctness of which depends only on the accuracy of the main regulator.

It can be introduced into a building already completed, and the power can be transmitted several hundred feet from the main regulator, at a small expense.

When once put up, it requires but little care and expense to keep the system in perfect working order.

It is regarded far superior to the ordinary clock, and will be found very valuable in public buildings, factories, shops, offices, &c., where a uniform ststem of time-keeping is essential.

Very respectfully, your obedient servants,

A. HENDERSON, *Chief Engineer, U. S. N.*
J. A. HOWELL, *Commander, U. S. N.*
H. C. NELSON, *Medical Inspector, U. S. N.*
S. CASEY, *Commander U. S. N.*
YATES STERLING, *Commander, U. S. N.*
S. H. POOK, *Naval Constructor, U. S. N.*
A. G. MENOCAL, *Civil Engineer, U. S. N.*

Except as to the words, "it is a perfect system of uniform time" and, "it is regarded as far superior to the ordinary clock"—which I am not prepared either to assert or deny—I agree in the above report.

FRANK C. COSBY, *Pay Inspector, U. S. N.*

U. S. COAST AND GEODETIC SURVEY OFFICE,
WASHINGTON, *March* 22, 1882.

HON. EDWARD H. ROLLINS,
Chairman Joint Committee on Public Buildings and Grounds, U. S. Senate Chamber, Washington, D. C.

SIR: In reply to an inquiry addressed to me by your committee, through its clerk, relative to the Wenzel Pneumatic Clock system, I have the honor to inform the committee.

1st. That the said system has been in operation in this office for about only one month, which time is entirely insufficient to give any opinion based upon experience.

2d. Electric Clocks have been in use in this office for seven or eight years past. They have been subject to frequent failures, arising from interruptions of contact in the circuit, and various other causes eluding ready recognition. For the successful use of an electric system of indication of time in a large public building, the employment of an expert is indispensible.

3d. The Pneumatic system operates in the simplest mechanical mode, the regulating time-piece giving periodic impulses to numerous dial hands, by a sudden compression of the air, contained in small connecting tubes. During two-thirds of each minute, the air within the tubes is in free communication with the outer air, so that the equilibrium cannot be disturbed by changes of temperature or pressure. The periodic compression of the air is effected every minute by plunging a hollow vessel into a liquid. This is a form of air-pump not subject to variations of friction. The level of the liquid is maintained by its not being subject to evaporation, such as glycerine and other known substances.

4th. It must not be supposed that any dial-moving system, transmitting the showing of a time-keeper, however efficient *at first*, can operate indefinitely without cleaning. The thickening of the lubricants, and the imperceptible accretion of dust will in time so increase the friction, as not only to effect the rate ef the time-keeper, but render the dial-moving action uncertain. The best chronometer requires cleaning after two or three years.

5th. In conclusion, I submit my opinion that the Wenzel Pneumatic Clock system will prove entirely satisfactory whenever the following conditions are filled, viz.:

First, that the air-pump be so proportioned to the air-space in the conducting tube, and to the number of dials to be moved, as to have a large excess of power, and second, that an annual cleaning and revision of the apparatus be provided for.

Yours, respectfully, J. E. HILGARD, *Superintendent.*

U. S. COAST AND GEODETIC SURVEY OFFICE.
WASHINGTON, *January* 5, 1883.

The Air-clocks furnished for this building give perfect satisfaction and we find them more reliable than the electric clocks. The regulator is equal to the best chronometer and can be depended upon within a few seconds.

Yours, respectfully, G. M. SAEGMULLER, *Chief Mechanician.*

SMITHSONIAN INSTITUTION,
WASHINGTON, D. C., *March* 21, 1882.

DEAR SIR: I am in receipt of yours of March 20, asking in behalf of the Committee on Public Buildings and Grounds, what I know

concerning the system of Pneumatic Clocks, and of their value compared with that of electric clocks.

In reply, I beg to say that I have had no experience whatever with Pneumatic Clocks, but have generally heard them very highly praised. I can make no comparison between the two kinds, but am free to say that the latter (electric clocks) cannot in their present state of imperfection be considered as entirely satisfactory.

Very respectfully, yours, SPENCER F. BAIRD.

W. H. JOHNSON, Esq.,
Clerk Senate Committee on Public Buildings and Grounds.

WASHINGTON CITY POST OFFICE, *July* 27, 1881.

It gives me pleasure to state that the Wenzel Air Clock, in use in the City Post Office, introduced by you, and connected with the main regulator, at a distance of two hundred and twenty-five feet, on the opposite square, has given *entire satisfaction*. For *uniform* and *correct* time I regard this clock superior to any in use and I have no hesitation in recommending it as being particularly adapted for Government buildings, where a uniform system of time is so much desired.

Very respectfully, D. B. AINGER, *Postmaster.*

POST OFFICE DEPARTMENT, MONEY ORDER OFFICE,
WASHINGTON CITY, *January* 22, 1883.

SIR: In furnishing the building last summer for the use of this office, I was led, after careful consideration, to advise the introduction into its various halls and rooms, of the Wenzel Pneumatic Clock System, which had given such satisfaction at the Coast Survey Office and in the Public School buildings of this city, with the view of securing uniform and reliable time-keepers.

With the approval of the Postmaster-General, a "regulator" was accordingly procured, of sufficient power to run, not only the clocks in all the offices and passages, but, also, two large clocks on the south and east fronts of the building, each of which indicates the same time as that of the motor clock. So far, these clocks, 35 in number, have given great satisfaction, keeping uniform time; and no reason can be seen why they should not continue to do so.

I cannot, therefore, too highly recommend them for general use in all cases where exact uniformity of time-keeping is desired in a number of rooms.

Very respectfully, yours, M. LARUE HARRISON,
Custodian, Money Order Building.

To JOHN A. PRESCOTT,
Pres. Wenzel Pneumatic Clock Co.

U. S. COAST AND GEODETIC SURVEY OFFICE,
WASHINGTON,, *January* 26, 1883.

HON. E. H. ROLLINS, *Chairman Commmittee on Public Buildings and Grounds, U. S. Senate.*

DEAR SIR: In reply to your letter of the 15th inst., inquiring as to the performance of the Wenzel Pneumatic Clocks, I have the honor to note that the clocks have been running in this office successfully for nearly one year. A few stoppages have occurred in consequence of the rubber connection between dial and pipe-line giving away. The parties supplying the clocks having established lead connections,

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no failures have occurred during the past six months. Other improvements in the details of the mechanism have been introduced, and I feel fully justified in re-affirming the commendations of the system, which I gave in March of last year.

Yours respectfully, J. E. HILGARD, *Superintendent.*

OFFICE OF SUPERINTENDENT OF PUBLIC SCHOOLS,
WASHINGTON CITY, D. C. *January* 25, 1883.

SIR: During the past two years the Wenzel Pneumatic Clock has been introduced into several of our public school buildings, and has given good satisfaction. We had tried a variety of clocks, including the electric, previously in our school buildings, and I am pleased to state that the Wenzel Pneumatic Clock has, thus far, been found superior to all others.

Respectfully, J. ORMOND WILSON, *Superintendent.*

JOHN A. PRESCOTT, Esq.,
President Wenzel Pneumatic Clock Co.

DEPARTMENT OF THE INTERIOR—BUREAU OF EDUCATION,
WASHINGTON, D. C. *January* 27, 1883.

SIR: My observation of the workings of the Pneumatic Clocks in the schools here and elsewhere, and the strong testimony given me in their favor by those using them, furnish me ground to endorse heartily the within commendation of them by Hon. J. Ormond Wilson, Superintendent of the Public Schools of the District.

Very respectfully, etc., JOHN EATON, *Commissioner.*

JOHN A. PRESCOTT, Esq.,
Pres. Wenzel Pneumatic Clock Co.

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PRICE-LIST.

STYLES SUITABLE FOR OFFICES, SCHOOLS, HOTELS, ETC.

	Bronzed Metal.	Carved Ash or Walnut Cases.
8-inch Dials	$10 00	$12 50
10 " "	12 00	15 50
12 " "	15 00	16 50
14 " "	18 00	18 50
16 " "	21 00	21 50

Mantel and Parlor Clocks, 3 and 4 inch Dials, in Ash, Walnut, Ebony, Celluloid, Marble, Bronze, etc., from $10 upwards.

Handsome cases specially designed to suit furniture and trimmings of first-class private residences, at reasonable rates.

REGULATORS.

(Plain cases.)

	Polished.
To operate 20 Dials, or less	$150 00	$175 00
" 50 " "	200 00	225 00
" from 50 to 100 Dials or less	250 00	275 00
" " 100 to 200 " "	325 00	350 00
" " 200 to 300 " "	425 00	450 00

REGULATOR CASES.

In Ash, Walnut, Mahogany, Rosewood, etc., from $50 upwards, according to style and finish.

PIPING.

Piping 10 cents per foot, or parties can have it done themselves, subject to the inspection of the company.

TO ESTIMATE FOR A BUILDING:

Take the price of Regulator to run the number of Dials to be used; add to this the number of feet of piping needed to connect Regulator with Dials, at 10 cents per foot, and to this sum add the price of the number and styles of Dials desired, and you will have the cost of the entire plant. If a Regulator case of handsome design is wanted, the price of such case must be added to the above.